REMARKS

In the Office Action dated October 4, 2006, the Examiner canceled the previous withdrawal of Claims 7, 33 and 37 and indicated they are now part of the elected species. Claims 1, 2, 5, 6, 8-10, 12, 14, 15-18, 27, 28, 31, 32, 34-36, 39, 41-45, 54, 58 and 60 were rejected under 35 U.S.C. §103(a) as being unpatentable over Johnson in view of Kita. Claim 37 was rejected under §103(a) as being unpatentable over Johnson in view of Kita and Schleifstein. Claims 3, 7, 19-22, 29, 33 and 46-49 were rejected under §103(a) as being unpatentable over Johnson in view of Kita and Smith. Claims 13, 40, 54-57 and 59 were rejected under §103(a) as being unpatentable over Johnson in view of Monette.

The undersigned attorney spoke with the Examiner on December 18, 2006, regarding the rejections, and Applicant thanks the Examiner for her time and consideration.

With regard to the §103(a) rejection based on Johnson in view of Kita, Applicant has noted in his previous response that Kita has nothing to do with nuclear resonant stimulation and there is no indication from either Kita or Johnson how the magnetic field source or microprocessor of Kita would be modified to carry out NMR or NQR. Kita only adjusts the power (magnetic field intensity) and not any frequency, so the proposed combination of Johnson and Kita still fails to result in any adjustment which would affect a nuclear resonant stimulation source. Independent Claims 1, 27 and 54 explicitly recite "nuclear resonant stimulation" and independent Claim 42 explicitly recites "nuclear magnetic resonance stimulation." The Office Action (at page 9, ¶ 8) incorrectly interprets a nuclear resonance stimulation source as any device "capable of stimulating atoms at the resonant frequencies." Nuclear resonance stimulation explicitly denotes stimulation of the nucleus, not the entire "atom." The word "nuclear" refers to the nucleus of an atom. Nuclear stimulation is subatomic, not atomic. As explained in the previous response, the polarizing effect of Kita (and Monette) is not subatomic. Applicant's specification also clearly indicates that nuclear resonance stimulation is either NMR or NQR. The Office Action thus effectively ignores the term "nuclear" altogether as it appears in the claims.

The Office Action (at page 10, ¶10) also confuses the teachings of Johnson with regard to radio frequency excitation. Johnson talks about molecules that have no magnetic resonance but

still may be "excited," and states that a beneficial result is provided by "rf excitation." This effect, however, is polarization and not nuclear resonance. Johnson even states this rf excitation effect is independent from that produced by the magnetic field (col. 1, lines 49-53 and col. 4, lines 9-12 of Johnson). Johnson never says you can achieve *nuclear resonance* without a static magnetic field, and the simple truth is you cannot. It is necessary to have a static magnetic field to first orient the nuclei and then use a second field (rf or other electromagnetic) at a different orientation, preferably orthogonal to the first field, which perturbs the aligned state of the nuclei.

The foregoing arguments also apply to the rejections using Schleifstein and Smith inasmuch as those rejections are primarily based on the proposed combination of Johnson and Kita.

With further regard to Claims 15-18 and 42-45, Applicant respectfully disagrees with the conclusion of the Office Action that Johnson ensures an activation time of 1 second or less before combustion such that the travel time is less than a resonance relaxation time of a stimulated component. The Office Action states that Johnson provides no specific time frame, but a time frame is indicated at col. 3, lines 56-60: "Likewise for present embodiments the excitation field has been applied to the fuel while the fuel is in the liquid state and at a time ahead of its combination in the carbureter to provide the fuel and air mixture." Activating the fuel in the described manner would result in the component relaxing by the time it is mixed with air and then fed to the combustion chamber. The Office Action continues to assert that Applicant has not demonstrated criticality for this feature, but the criticality was indeed addressed in Applicant's previous response, particularly in noting that Applicant's specification explicitly states at page 5, lines 3-5, that relaxation times are a "critical consideration" in the placement of NMR/NQR components for combustion enhancement systems.

With regard to the §103(a) rejections based on Johnson in view of Monette, Applicant would incorporate the above arguments regarding Johnson and reiterate that Monette fails to teach the adjustment of a nuclear resonance stimulation source. As with Kita, Monette says nothing about nuclear resonance (NMR or NQR). Monette's physical mechanism is polarization of the combustion materials, which is a completely different phenomenon from nuclear resonance. Polarization flips and oscillates the entire atom or molecule, but NMR and NQR do not flip the atom or even flip the nucleus. The nuclei in NMR/NQR are perturbed but not rotated 180 degrees, and the resulting nuclear motion is not oscillation but is precession (wobble).

These differences in the physical mechanisms are crucial as they relate to how the instrumentation must be implemented. The foregoing explanation regarding the need for two separate applied fields, including at least one static magnetic field, relates to these differences in the physical mechanisms. Monette is inapplicable because it does not provide both a static magnetic field and a second alternating field (RF or other electromagnetic). The Office Action (at page 10, ¶10) incorrectly states that the single magnetic field of Monette is capable of stimulating an atom to *nuclear* resonance. As explained above, it is necessary to have a first field to align the nuclei, and further have a second field to perturb that alignment. The feedback control logic of Monette is specifically adapted only for controlling a polarizing magnetic field, and there is virtually nothing in Monette that would suggest to one skilled in the art that the adjustment of a single-field, polarizing source could be modified to allow adjustment of a dual-field, nuclear resonant stimulation source, making it clear that this rejection is based solely on hindsight. Applicant has also previously explained how these differences between the polarizing fuel system of Monette and the present invention are reflected in the range of frequencies involved. Applicant's specification recognizes the criticality of the proper frequency in noting that even individual molecular compositions of targeted elements will have unique input resonant frequency requirements (page 15, lines 26-28). This combination thus cannot support an obviousness finding because it still does not enable Applicant's invention.

With further regard to Claims 13, 40 and 59, Applicant would respectfully submit that Monette does not provide feedback based on the temperature of the exhaust stream. The only mention of temperature in the specification of Monette (at col. 5, lines 38-39) refers to the sensing of the "ambient" temperature, not the exhaust stream. As noted in Kita (col. 2, lines 12-15) the temperature of the permanent magnetic material itself can result in performance variations, and it is these variations that Monette is concerned with. Monette is correcting the frequency based on ambient temperature surrounding the apparatus, which will be considerably cooler than the temperature of an exhaust stream from a combustion reaction. The ambient temperature has no bearing on the feedback control unit of the present invention. Claims 13, 40 and 59 explicitly recite the "temperature in the exhaust stream." This single feedback differentiation from the prior art is an important distinction, but is even more broadly indicative of the intended purpose of feedback logic as it relates to the present application of combustion science. Applicant describes a real time, active (closed loop) software feedback control system for the purpose of dynamic and multiple operational input adjustments. Monette (as well as

Kita) utilizes feedback only for the purpose of (open loop) experimental verification of their theoretical, limited in number, static input hardware designs. Although the rejection of these Claims is not based on Kita, Applicant would further note that Kita also fails to disclose or suggest feedback based on the temperature of the exhaust stream. The exhaust sensor of Kita only gives an indication of the levels of oxides of nitrogen (col. 6, lines 6-12).

Since none of the proposed combinations discloses or suggests adjustment of a nuclear resonant stimulation source based on sensed operating parameters, they accordingly cannot render the present invention obvious. For all of the foregoing reasons, Applicant respectfully requests reconsideration of the §103(a) rejections.

Applicant has also added new dependent Claims 61 and 62 directed to multiple simultaneous targeted nuclear resonance stimulation. This feature is discussed in Applicant's specification at page 14, lines 18-20, so no new matter has been added. Applicant previously paid for the presentation of 60 claims and there are currently 59 claims being presented including Claims 61 and 62 since Claims 11, 38 and 55 were previously deleted, so no fee is due for the addition of these claims. However, if any fee is due for the presentation of new Claims 61 and 62 then please charge any required fees to deposit account number 50-2053.

Applicant has made a diligent effort to advance the prosecution of this application by adding new claims and pointing out with specificity how the claims as presented patentably define the invention over the prior art of record. In view of the remarks set forth herein, the application is believed to be in condition for allowance and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the examiner is requested to telephone the undersigned.

Respectfully submitted,

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